

BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Foundation Diploma in Engineering Pearson BTEC International Level 3 Diploma in Engineering Pearson BTEC International Level 3 Diploma in Electrical and Electronic Engineering Pearson BTEC International Level 3 Diploma in Mechanical Engineering Pearson BTEC International Level 3 Diploma in Digital Engineering Pearson BTEC International Level 3 Diploma in Manufacturing Engineering Pearson BTEC International Level 3 Diploma in Aeronautical Engineering Pearson BTEC International Level 3 Extended Diploma in Engineering Pearson BTEC International Level 3 Extended Diploma in Electrical and Electronic Engineering Pearson BTEC International Level 3 Extended Diploma in Mechanical Engineering Pearson BTEC International Level 3 Extended Diploma in Digital Engineering Pearson BTEC International Level 3 Extended Diploma in Manufacturing Engineering Pearson BTEC International Level 3 Extended Diploma in Aeronautical Engineering
Unit number and title	Unit 43: Manufacturing Computer Numerical Control Machining Processes
Learning aim(s)	A: Examine the control systems used in Computer Numerical Control machines and different computer programming methods
Assignment title	CNC control systems and programming
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You are working as a trainee CNC operator for a company that manufactures complex components that would be difficult to manufacture using traditional methods. Your supervisor is pleased with the progress that you have made, and has suggested that you are ready to gain a deeper understanding of how CNC machines are controlled and programmed. She wants you to feed back your findings in a report, so she can consider the next steps in your training.
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Task 1	You have been asked to: a) examine the control systems and programming methods that are used for different CNC machines to manufacture products and components; and b) investigate the reasons for the selection of control systems, feedback systems and programming methods for given CNC machining applications. To do this: You need to carry out research associated with different CNC machine tool control systems, open and closed loop feedback systems and methods used for part programming CNC machines. Your tutor will give you two different components that have been manufactured using CNC machines. You should then use your research to produce a report that: • Explains/justifies the selection of the control mechanisms and feedback systems of a CNC machine for the given applications (components). You will need to cover the machine control unit, drive mechanisms and the use of transducers, along with open and closed loop feedback systems (for example, feedback, correction and error detection) to ensure the overall quality/accuracy of the physical outcome. • Explains/justifies the selection of two different programming methods to develop CNC computer programs for the given applications. You should cover non-conversational and conversational programming and the efficiency of CNC programs with reference to the complexity of the data interface, code structure and the commands selected/combined, materials type and the overall quality/accuracy of the physical outcome. Make sure you focus on how the systems and methods interact and influence the CNC machining process for both components.
Checklist of evidence required	A written report to investigate and feed back on the control mechanism of a typical industrial CNC machine (based around Open Loop and Closed Loop systems) and its relationship to achieving accuracy via a computer program.
Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria you must show that you are able to:
43/A.D1	Justify the selection of the control system, feedback system and programming methods for different Computer Numeric Control machining applications
43/A.M1	Analyse how the interaction of the control system, feedback system and programming methods influence the Computer Numeric Control machining process
43/A.P1	Explain the control system, feedback system and programming methods used in Computer Numeric Control machines



Sources of information to support you with this Assignment	Books Smid P; CNC Programming Handbook, 3rd Edition (Industrial Press, 2007); ISBN 9780831133474. Smid P; CNC setup for Milling and Turning: Mastering CNC Control Systems (Industrial Press Inc., 2010) ISBN 9780831133504 Websites www.haas.co.uk http://website.denford.ltd.uk www.techsoft.co.uk www.fanuc.eu/uk/en www.heidenhain.co.uk
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